

Deepwater Horizon/Mississippi Canyon 252 Spill

As agreed upon by the Trustees and BP, all samples collected for contaminant analysis during the sampling plan described below will be sent to Alpha Analytical Laboratory, unless they are designated to be archived. Samples for other analyses, if not archived, will be sent to the laboratories indicated in the plan below.

Each laboratory shall simultaneously deliver raw data, including all necessary metadata, generated as part of this work plan as a Laboratory Analytical Data Package (LADP) to the trustee Data Management Team (DMT), the Louisiana Oil Spill Coordinator's Office (LOSCO) on behalf of the State of Louisiana and to BP (or ENTRIX on behalf of BP). The electronic data deliverable (EDD) spreadsheet with pre-validated analytical results, which is a component of the complete LADP, will also be delivered to the secure FTP drop box maintained by the trustees' Data Management Team (DMT). Any preliminary data distributed to the DMT shall also be distributed to LOSCO and to BP (or ENTRIX on behalf of BP). Thereafter, the DMT will validate and perform quality assurance/quality control (QA/QC) procedures on the LADP consistent with the authorized Quality Assurance Project Plan, after which time the validated/QA/QC-ed data shall be made available simultaneously to all trustees and BP (or ENTRIX on behalf of BP). Any questions raised on the validated/QA/QC results shall be handled per the procedures in the Quality Assurance Project Plan and the issue and results shall be distributed to all parties. In the interest of maintaining one consistent data set for use by all parties, only the validated/QA/QC-ed data set released by the DMT shall be considered the consensus data set. In order to assure reliability of the consensus data and full review by the parties, no party shall publish consensus data until 7 days after such data has been made available to the parties. Also, the LADP shall not be released by the DMT, LOSCO, BP or ENTRIX prior to validation/QA/QC absent a showing of critical operational need. Should any party show a critical operational need for data prior to validation/QA/QC, any released data will be clearly marked "preliminary/un-validated" and will be made available equally to all trustees and to BP (or ENTRIX on behalf of BP).


All materials associated with the collection or analysis of samples under these protocols or pursuant to any approved work plan, except those consumed as a consequence of the applicable sampling or analytical process, must be retained unless and until approval is given for their disposal in accordance with the retention requirements set forth in paragraph 14 of Pretrial Order # 1 (issued August 10, 2010) and any other applicable Court Orders governing tangible items that are or may be issued in MDL No. 2179 IN RE: Oil Spill by the Oil Rig "DEEPWATER HORIZON" (E.D. LA 2010). Such approval to dispose must be given in writing and by a person authorized to direct such action on behalf of the state or federal agency whose employees or contractors are in possession or control of such materials.

This plan will be implemented consistent with existing trustee regulations and policies. All applicable state and federal permits must be obtained prior to conducting work.

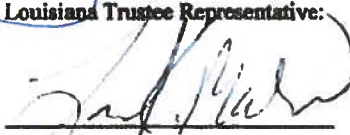
Mississippi Canyon 252 Spill
Spring 2011 Oyster Recruitment Sampling Plan

Approval of this work plan is for the purposes of obtaining data for the Natural Resource Damage Assessment (NRDA). Parties each reserve its right to produce its own independent interpretation and analysis of any data collected pursuant to this work plan.

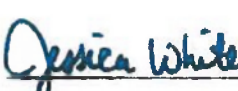
APPROVED:

FOR KALAMAND GULF ONLY


Louisiana Trustee Representative: Date 7/29/2011



BP Representative: Date July 15, 2011



NOAA Trustee Representative Date 7/7/2011
(on behalf of all other trustees)

Mississippi Canyon 252 Spill

Spring 2011 Oyster Recruitment Sampling Plan

June 22, 2011

Objective/Purpose: After reviewing observational data and limited analytical data generated from the field efforts implemented under the Phase I Pre-assessment work plan and its amendments and the Oyster Sampling Transition Plan (Transition Plan), the oyster working group has determined that a need exists for injury assessment sampling to estimate the degree and spatial and temporal extent of potential injury to oyster reproduction resulting from: 1) potential exposure of oysters to contaminants released into the environment as a result of the Deepwater Horizon Oil Spill; and/or 2) potential exposure of oysters to low salinities resulting from actions undertaken by the state of Louisiana in response to the spill. This plan is intended to resample sites from both plans during the spring oyster reproductive season to further characterize the temporal and geographic extent of any potential injury.

The Phase I sampling plan from the Summer of 2010 included sampling of oyster reproductive metrics at historic collection locations of the States' resource management agencies (~36 sites in LA, 15 in MS, 12 in AL, and 12 in FL). This sampling was supplemented last fall by a randomly selected sample of sites in Louisiana and Mississippi that expanded the geographic coverage of sampling within areas known or likely to contain oyster habitat, and collected oyster reproduction and recruitment samples during an expected period of increased oyster reproductive activity. The Transition Plan also expanded sampling in freshwater diversion areas in Louisiana. Freshwater diversion areas (Figure 1) are areas under the influence of freshwater resulting from diversions of freshwater by Louisiana to meet salinity targets for fisheries and maintain vegetation health. Following the MC 252 spill, freshwater diversions were employed for an extended period of time in an attempt to keep oil away from the Louisiana coastline.

The results of this plan (hereafter the Spring Recruitment Sampling Plan) will be used to support the modeling of injury to oyster recruitment and to inform and support restoration planning efforts.

Below is a summary of the key aspects of the Spring Recruitment Sampling Plan:

- The plan collects samples at locations previously mapped and sampled under the two prior DWH NRDA oyster plans. This includes Transition Plan locations in Louisiana and Mississippi that were characterized as known oyster habitat (i.e., they included either oyster reef mapped prior to the DWH spill or they were identified by State biologists to

have a high probability of productive oyster habitat). It also includes Phase I sampling sites that were historically sampled prior to the DWH spill across all four states.

- The set of sample sites includes a non-randomly selected set of 46 historically sampled 200 meter x 200 meter grid cells from the Phase I plan located across Louisiana (23), Mississippi (5), Alabama (7), and Florida (11). It also includes the randomly selected sample of up to 80 of the 600 meter x 600 meter grid cells (sites) from the Transition Plan, including up to 70 sites in Louisiana and 10 in Mississippi. Finally, it includes a small set (up to 10 sites) of non-randomly chosen Transition Plan grid cells in Louisiana that were characterized by higher frequencies of observed surface oiling in the months following the MC252 spill.
- Oyster recruitment metrics will be measured using settlement plates during up to three sampling rounds at these sites.
- A set of three dredge replicates per site are planned to document presence/absence of live oyster¹ as well as provide quantitative enumeration of oyster abundance. Dredge work will occur at one-third of the recruitment sites during each round of recruitment sampling, so that each site will be dredged once by the end of the Spring plan.
- Live oysters, if present, will also be collected from dredge samples and analyzed for contaminant burden and gonad/disease condition metrics at a subset of approximately one-third of the recruitment sites during each round of recruitment sampling.

The focus of this plan on reproductive and recruitment sampling metrics reflects the oyster working group's interest in assessing potential reproductive injury and recruitment impacts compared to baseline conditions during a time of year where oysters are expected to exhibit increased reproductive activity; the oyster working group may further assess potential injury to oyster resources using additional metrics such as abundance and biomass in subsequent sampling plans.

Estimated samples from this activity (see Tables 1 and 2):

- Up to 136 dredge surveys (one set of three replicates per site);
- Up to 136 composite oyster tissue samples (one per site, up to 6 market-sized oysters analyzed (or equivalent) per sample);

¹ Oysters from each replicate will be enumerated into three size categories: spat (less than 1 inch shell height); seed oysters (between 1 and 3 inches); and market size oysters (3 inches and greater).

- Up to 136 oyster gonad/disease/condition samples (one per site, up to 15 market-sized oysters analyzed per sample); and
- Up to 408 sets of recruitment samples (three sampling events, with 136 sets collected each round).

Site Selection

No new sites were selected for sampling as part of the Spring Recruitment Sampling Plan; all sites to be sampled were previously sampled as part of either the Phase I Plan or the Oyster Transition plan.² Table 3 shows the numbers of sites to be sampled from each of these plans; it includes all of the Transition Plan sampling locations, including the Supplemental sites added in Amendment 1 to the Transition Plan plus 46 of the Phase I locations. The subset of Phase I sampling locations to be included was determined as follows:

- A next nearest neighbor exclusion criterion was employed to pare back Phase I sites while maintaining well-dispersed geographic coverage of the study area:
 - All Phase I sites within 2 km of a Transition Plan site were dropped.
 - Pairs or clusters of Phase I sites within 2 km of one another were identified; Phase I sites in a cluster that do not have historical data available were dropped. One sample from each remaining pair or cluster was randomly selected for inclusion.

Figures 2 through 13 present maps indicating the Spring Recruitment Sampling Plan locations.

² All sites have been analyzed previously for recruitment using settlement plates, with the exception of the Supplemental Transition Plan sites added in Amendment 1 to the Transition Plan (May 5, 2011). These sites will comprise at most 20 of the sites to be sampled in the current plan. Results from these sites are of interest, because these sites were observed to have a higher frequency of surface oiling than other sites in the Transition Plan. (See Transition Plan Amendment 1 for more information.)

Health and Safety

- **The team leader and field crew parties should have completed all applicable health and safety training as directed by NOAA or state agency oil spill policy.**
- **All field team members must complete the NOAA safety training and documentation requirements as set forth in "Safety Requirements for All Personnel Working on NOAA-led NRDA teams for MS Canyon 252 Incident".**
- **All field team members should read all of the safety documents posted in the safety section of the resource catalog case site (www.noaanrda.org).**
Exception: if site collection activities do not include use of a boat or helicopter, then familiarity with the safety documents for these vehicles is not required.
- **Each field team must submit a plan, not later than the night prior to going into the field. This plan must specify:**
 - The team leader;
 - Names of all team members;
 - The sampling location(s)-- please use the grid coordinates as provided to your team by NOAA NRDA Field Ops staff or the NRDA Oyster Sample Location Coordinator;
 - What kind of sampling they are doing;
 - Expected arrival time at sampling area (daily);
 - Expected departure from sampling area (daily);
 - Team deployment date;
 - Team return date.

This information may be reported in one of two ways:

1. Fill out the Excel spreadsheet "Team Member Information Form – Sampling and Safety.xls" and send it to [REDACTED]. Please use one tab for each team.
 2. If you cannot submit this spreadsheet electronically, you can call in and report the information using this number: [REDACTED]
- **Field teams must adhere to all procedures set forth in the most recent version of the MC252 Site Safety Plan in effect at the time of their field work (currently the 1/28/2011 version).**
 - **If participating in a cruise:** Each cruise may have additional required health and safety procedures, which must be observed.
 - **Diving:** Although not proposed as part of this plan, SCUBA or surface-assisted diving, where used for sampling, will be conducted in accordance with existing Trustee dive safety programs.

Cost Estimate

Table 4 provides the cost estimate for the Spring Recruitment Sampling Plan, assuming all 136 sites are sampled. The total cost associated with this level of field effort is \$872,400 (see Table 4 for details). Analytical costs for samples collected as part of this plan add up to another \$238,000, including up to \$204,000 for tissue contaminant analysis, and up to \$34,000 for gonad/disease samples, bringing the total cost of the study to \$1,110,400.

The Parties acknowledge that this budget is an estimate, and that actual costs may prove to be higher due to a number of potential factors. BP's commitment to fund the costs of this work includes any additional reasonable costs within the scope of this work plan that may arise because of any contingencies. The trustees will make a good faith effort to notify BP in advance of any such contingencies.

Table 1. Proposed metrics for the Spring Recruitment Sampling Plan

Metric	Proposed Frequency of Sampling
<i>Effect Metrics</i>	
Disease	One sample per site collected during up to three events (spaced up to three weeks apart)
Gonadal condition	One sample per site collected during up to three events (spaced up to three weeks apart)
Larval settlement	Up to three events (spaced up to three weeks apart)
<i>Exposure metrics</i>	
Tissue concentrations	Up to three events (spaced up to three weeks apart)
Oiling observations (qualitative)	Collected on each site visit

Table 2: Estimated Sampling Activity for Spring Recruitment Sampling Plan

Metric	Method	N = Sample Sizes (Potential Maximum # of sites)				Estimated subsamples per site	Estimated subsamples per event	Freq. of sampling	Estimated Total # of subsamples
		<i>LA</i>	<i>MS</i>	<i>AL</i>	<i>FL</i>				
Oyster Settlement	Settlement plate	103	15	7	11	2 samples (3 plates each) ¹	272	3	816 (408 analyzed)
Oyster Gonadal, Condition and Disease	Oysters	103	15	7	11	10-15 oysters	1,360 - 2,040 oysters (136 samples)	1	1,360 -2,040 oysters
Tissue contaminant analysis	Oysters	103	15	7	11	6 oysters (1 composite)	816 oysters (136 composites)	1	816 oysters (136 composites)

¹ Two samples are deployed at each site in the event that one sample is lost during the deployment period. If both samples are retrieved, one sample from the pair will be selected randomly and analyzed, so that only one sample will be enumerated per site. Both the analyzed sample and the unanalyzed sample will be archived.

Table 3. Spring Assessment Plan Numbers of Sampling Sites by State.

State	Site Type	# Sites
LA	Transition	60 - 80
	Phase I Amendment 2	23
	Sub-Total	83 - 103
MS	Transition	10
	Phase I Amendment 2	5
	Sub-Total	15
AL	Phase I Amendment 2	7
FL	Phase I Amendment 2	11
Sub-Total	Transition	70-90
	Phase I Amendment 2	46
Total		116 - 136

Table 4. Costs for Spring Recruitment Sampling Plan (Assumes 136 Sites)

Item	Unit cost	Units	Units	Costs (per event)	# (of events)	Total cost
FIELD SAMPLING/PROCESSING						
Settlement Plate and Dredge						
Field Sampling (Rds 1-3)				\$192,600	3	\$577,800
Personnel	\$1,600	Person days	60	\$81,600		\$244,800
Boat charges	\$1,600	Days	60	\$96,000		\$288,000
Supplies	\$250	Days	60	\$15,000		\$45,000
Settlement Plate Pickup (Rd 4)				\$128,400	1	\$128,400
Personnel		Person days		\$54,400		\$54,400
Boat charges	\$1,600	Days	40	\$64,000		\$64,000
Supplies	\$250	Days	40	\$10,000		\$10,000
Settlement Plate Processing				\$22,840	3	\$68,520
Personnel	\$5	Person days		\$20,800		\$62,400
Supplies	\$5	Samples	136	\$680		\$2,040
Shipping and archive charges	\$5	Samples	272	\$1,360		\$4,080
Dredge Processing				\$85,680	1	\$85,680
Personnel		Person days		\$81,600		\$81,600
Supplies	\$5	Samples	408	\$2,040		\$2,040
Shipping and archive charges	\$5	Samples	408	\$2,040		\$2,040
Cooler Rental	\$2,000	month	3	\$6,000	2	\$12,000
Field Sampling/Processing Total						\$872,400
LABORATORY ANALYSIS						
Sediment Contaminants	1,500	Sample	N/A	N/A	N/A	N/A
Oyster Contaminant	1,500	sample	136	\$204,000	1	\$204,000
Disease and Gonad	250	sample	136	\$34,000	1	\$34,000
Laboratory Total						\$238,000
TOTAL						\$1,110,400

Figure 1. Freshwater Diversion Areas in Louisiana

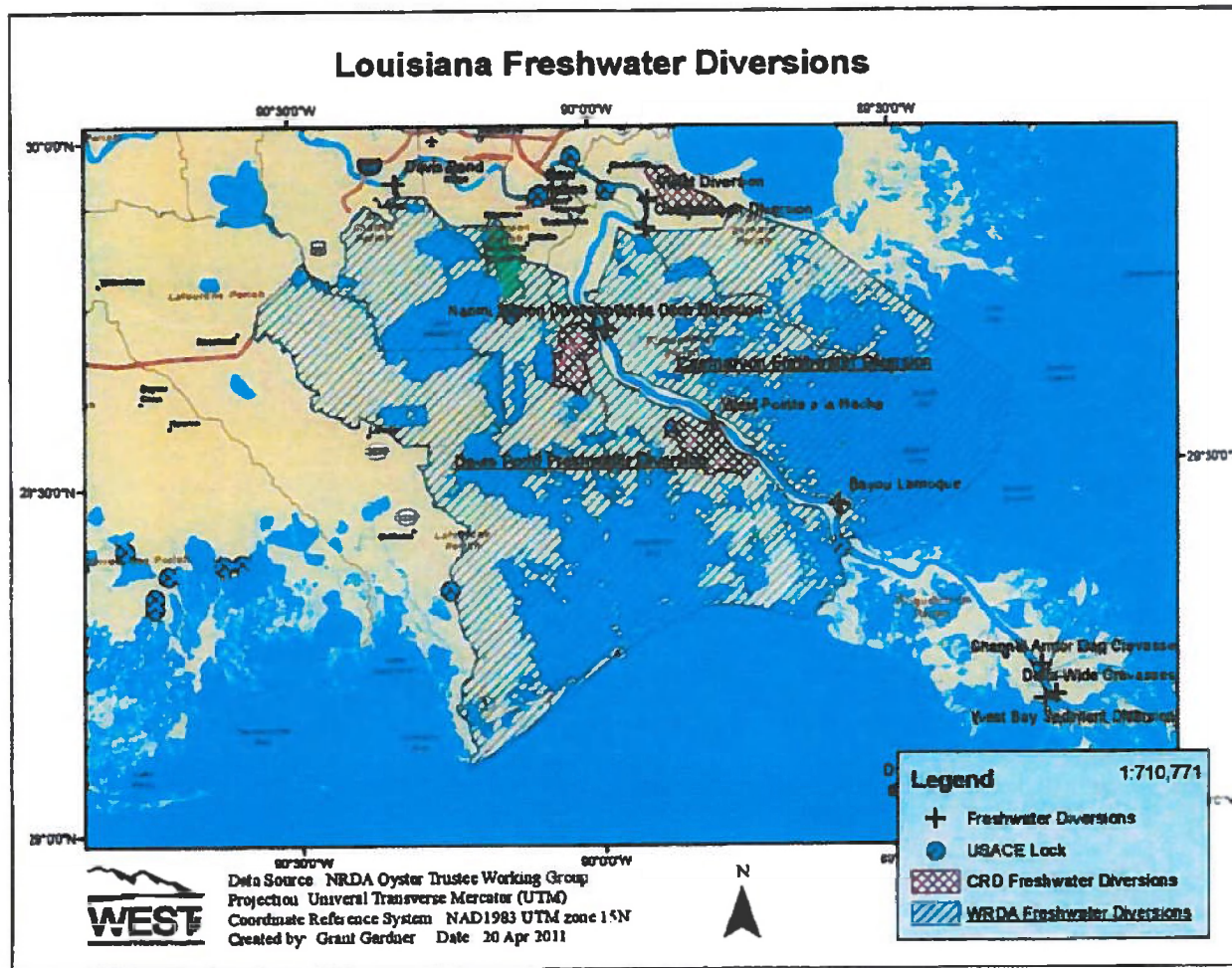


Figure 2. 2011 Spring Sampling Locations in Louisiana (CSA 1-2 North)

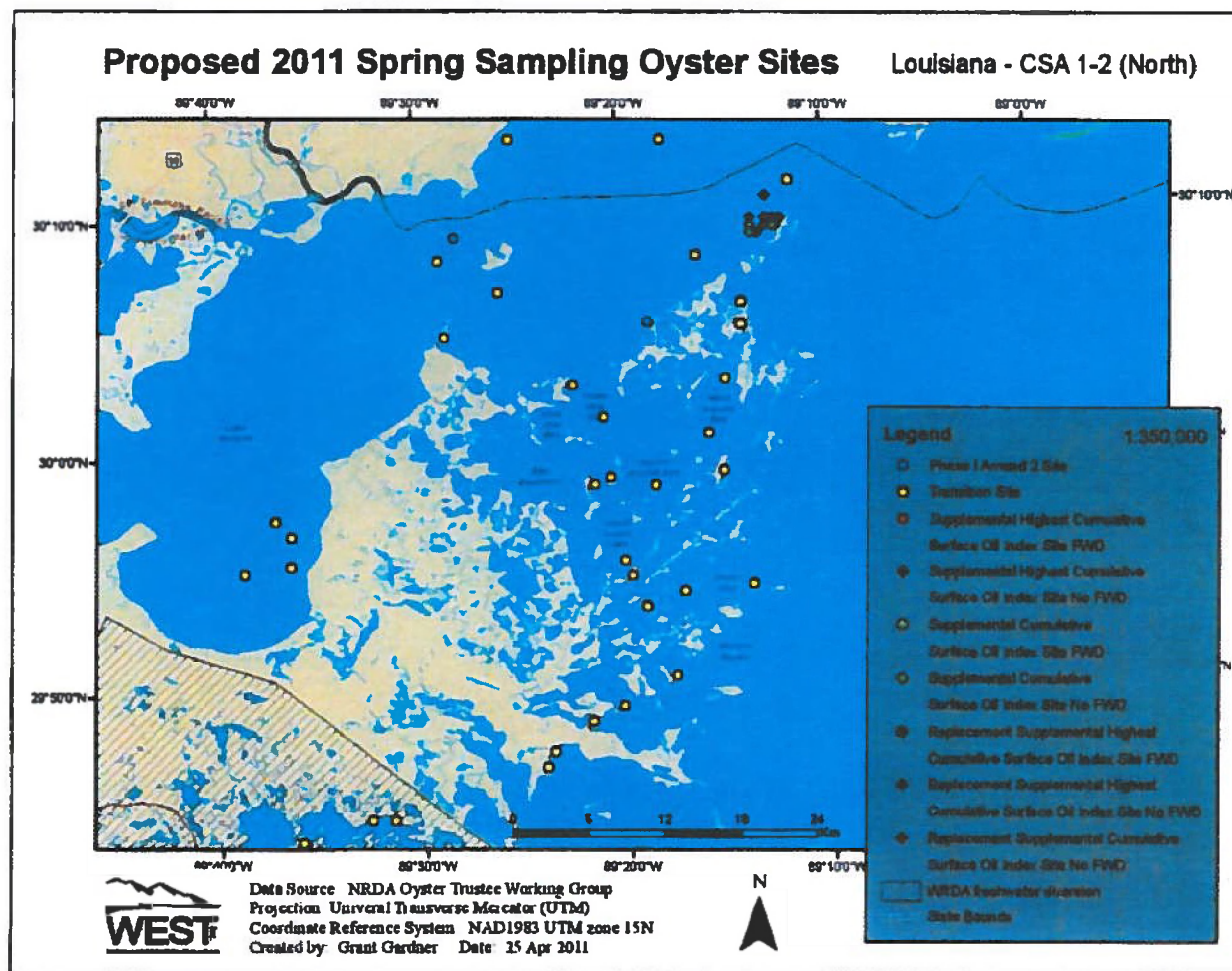
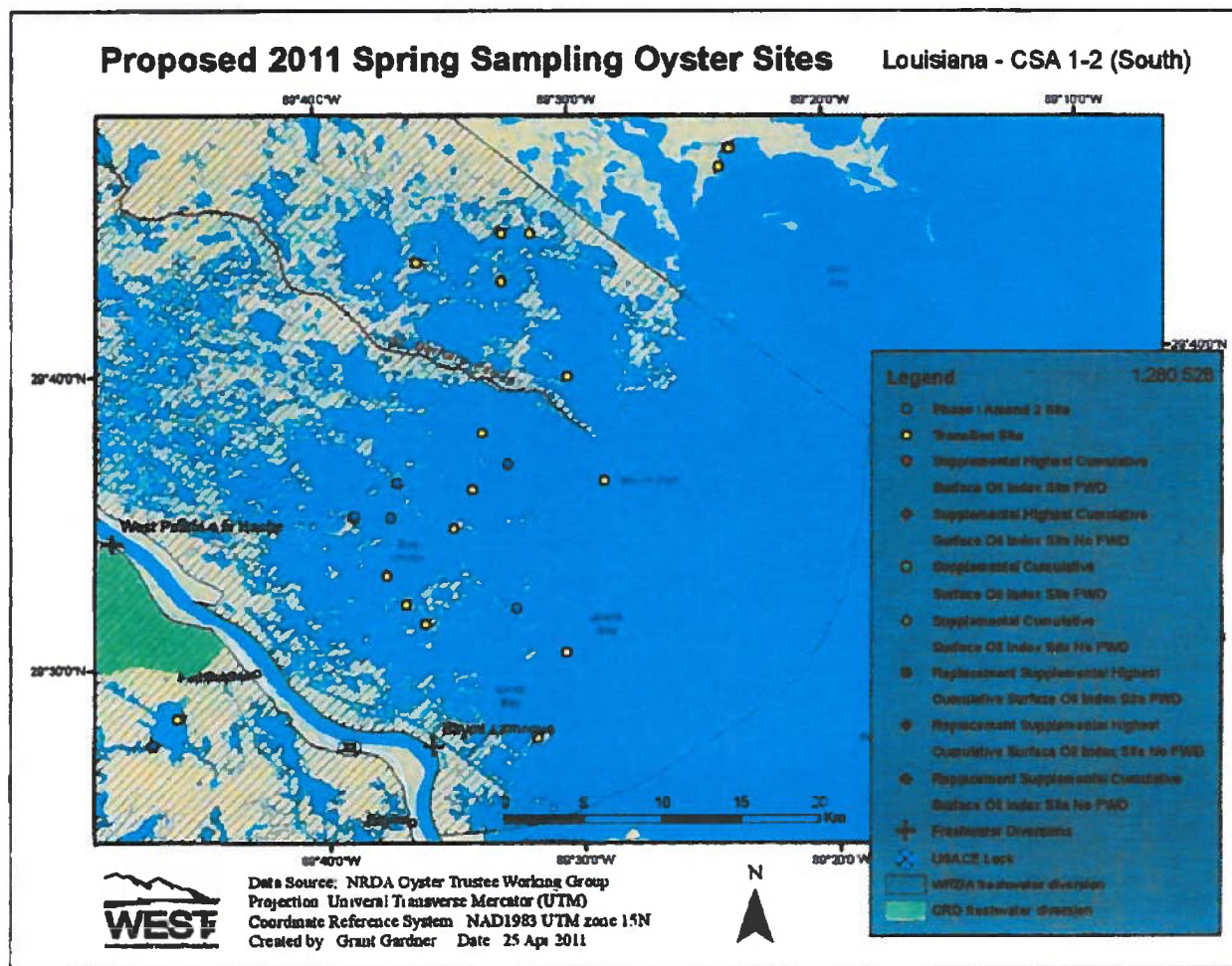


Figure 3. 2011 Spring Sampling Locations in Louisiana (CSA 1-2 South)



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Figure 5. 2011 Spring Sampling Locations in Louisiana (CSA 4-5)

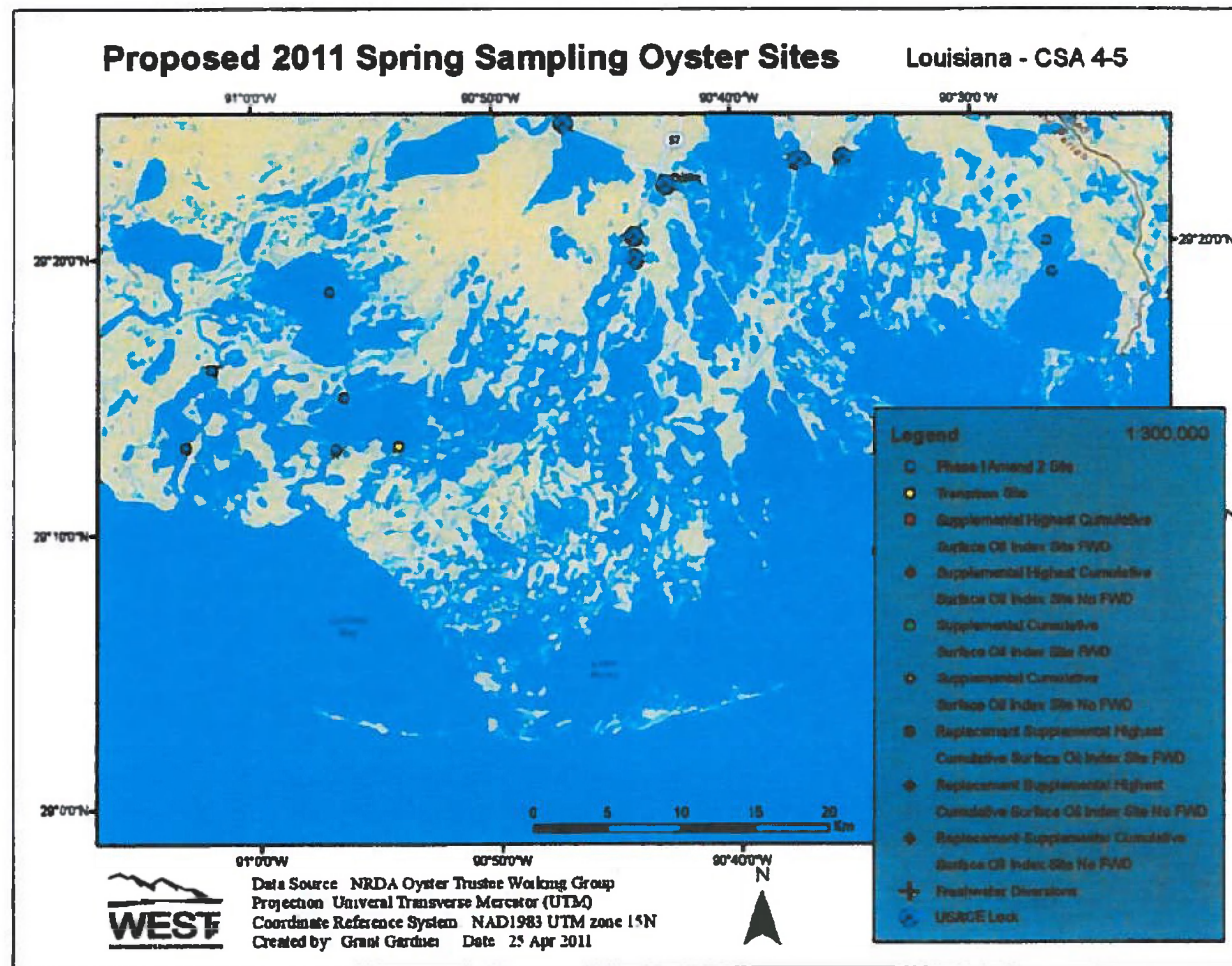
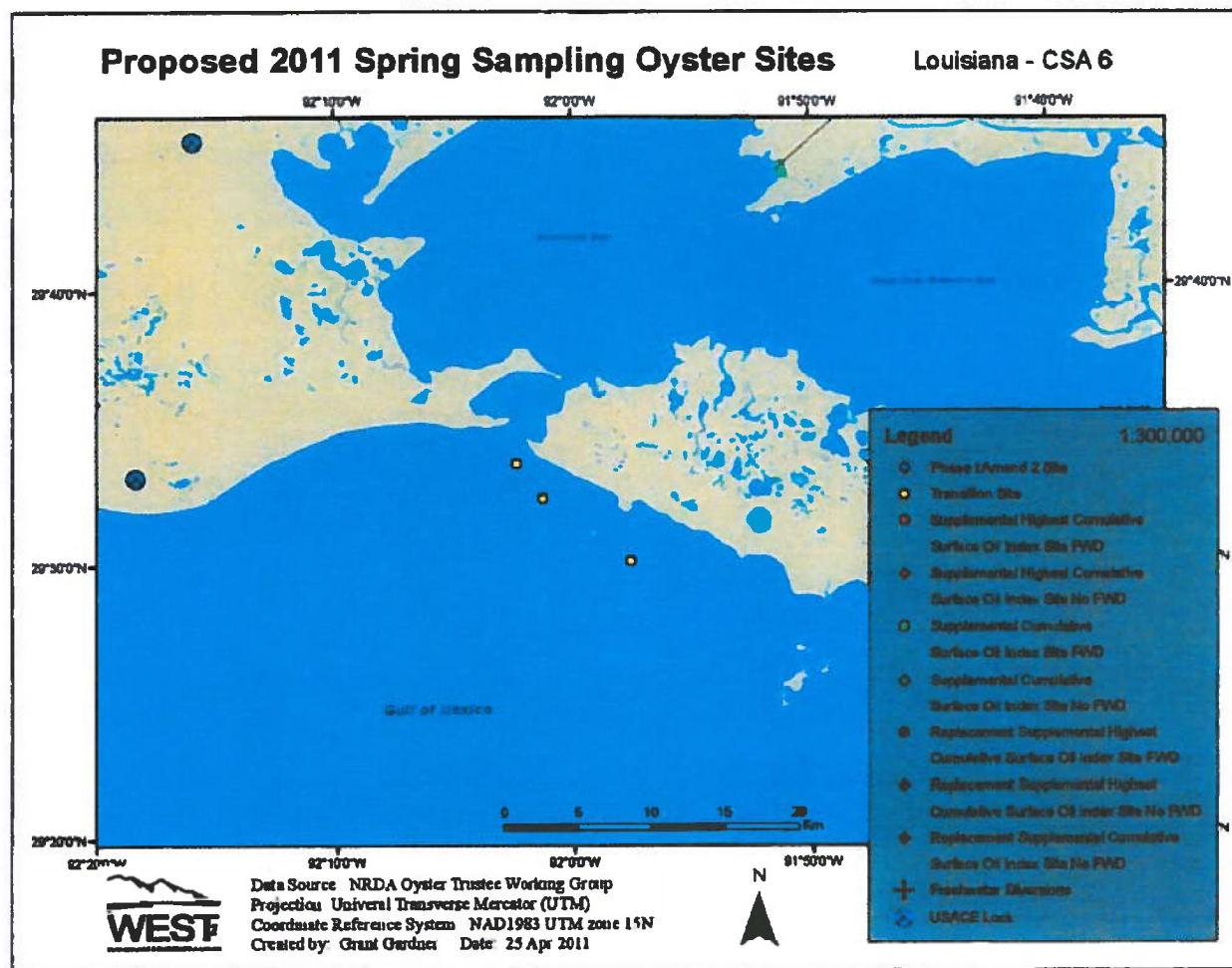


Figure 6. 2011 Spring Sampling Locations in Louisiana (CSA 6)



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Figure 8. 2011 Spring Sampling Locations in Mississippi (Pass Christian)

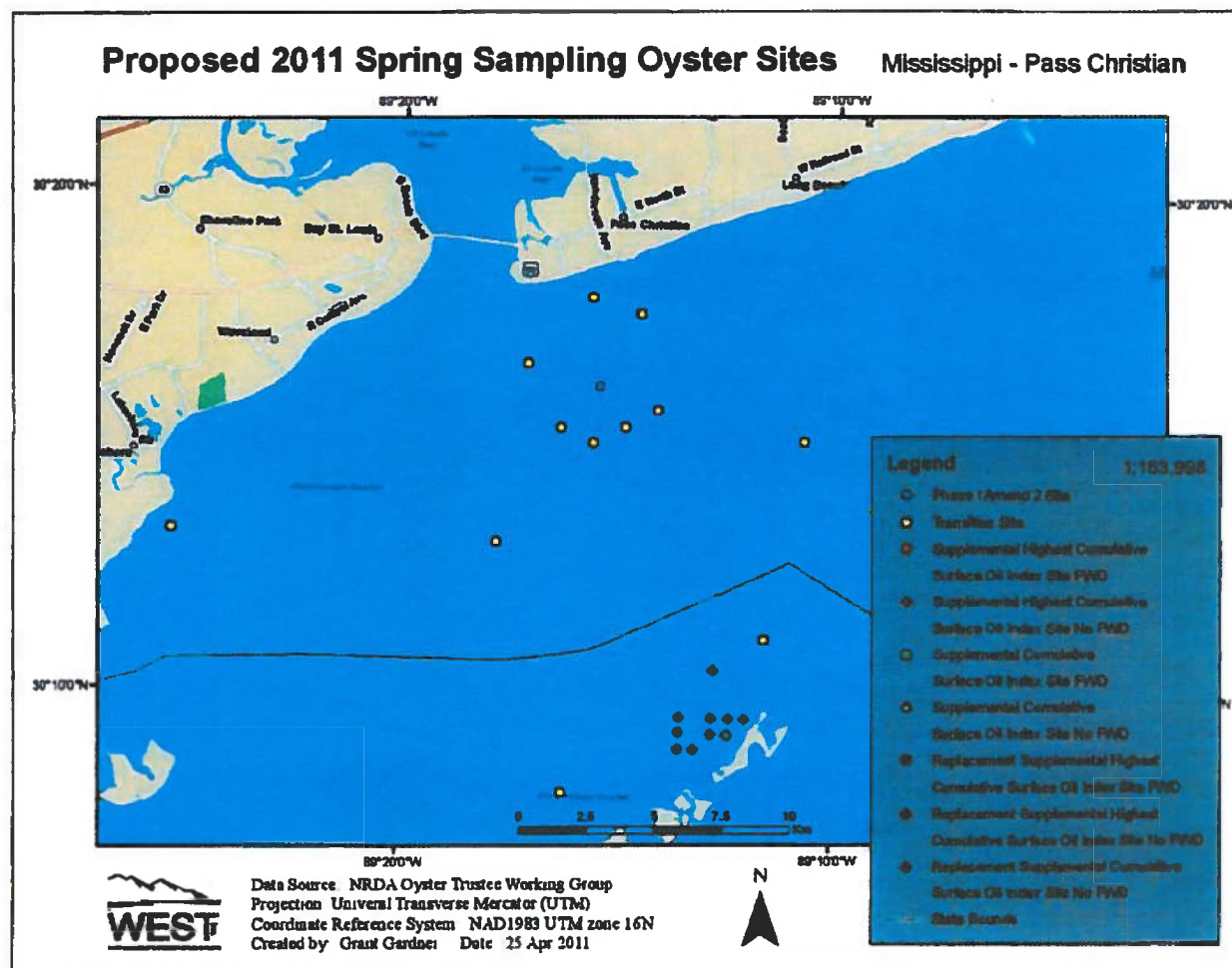


Figure 9. 2011 Spring Sampling Locations in Mississippi (Biloxi)

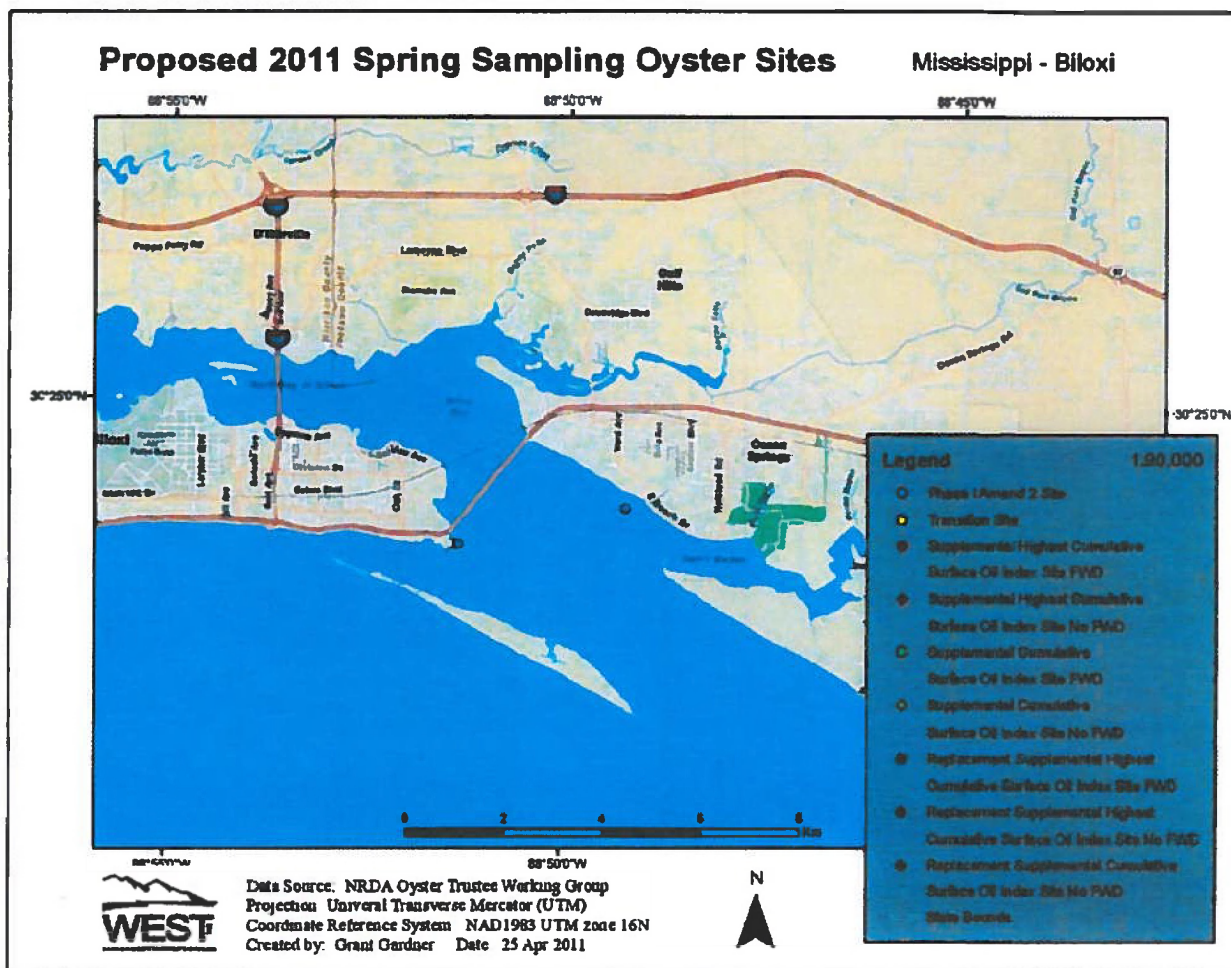


Figure 10. 2011 Spring Sampling Locations in Mississippi (Pascagoula)

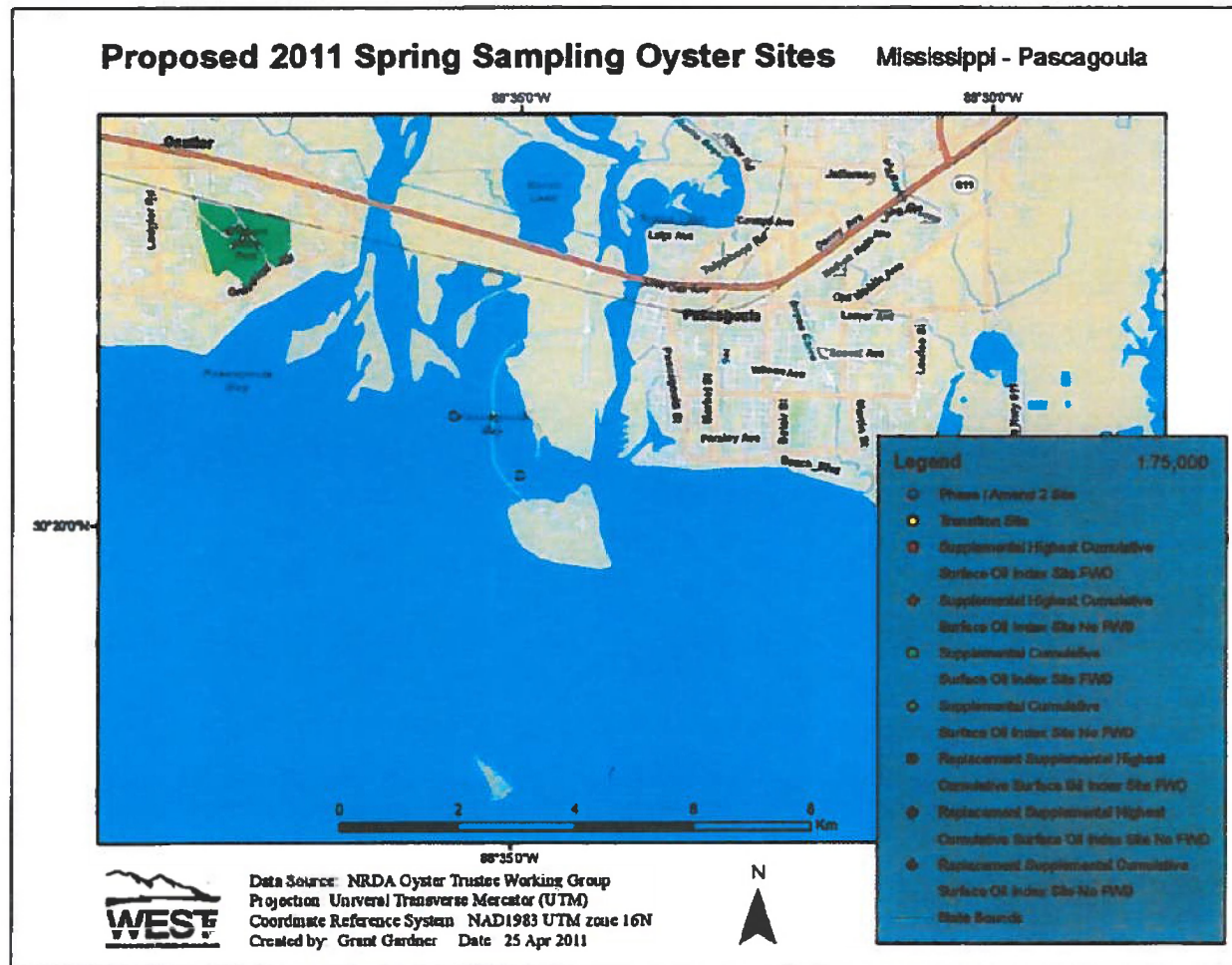


Figure 11. 2011 Spring Sampling Locations in Alabama

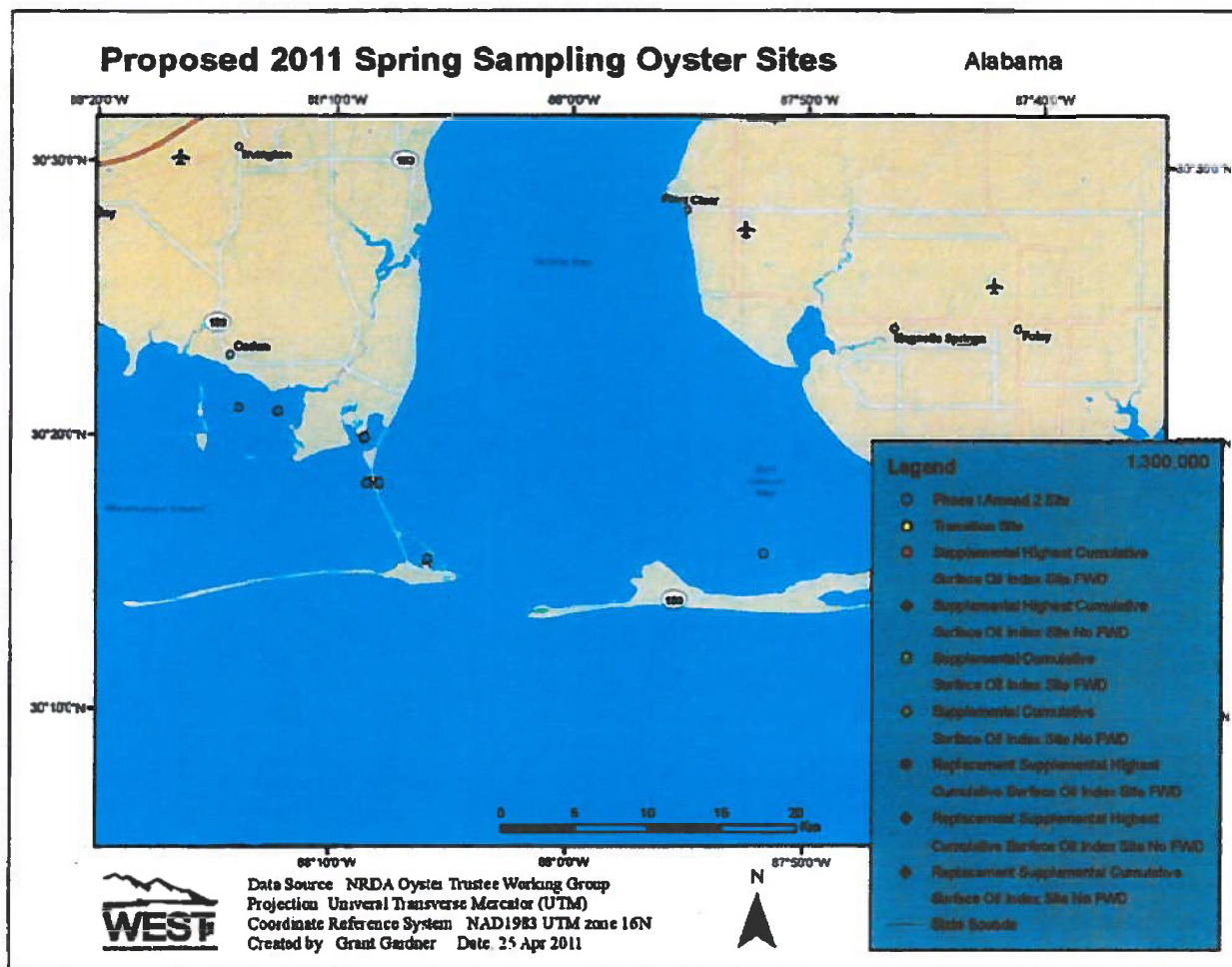
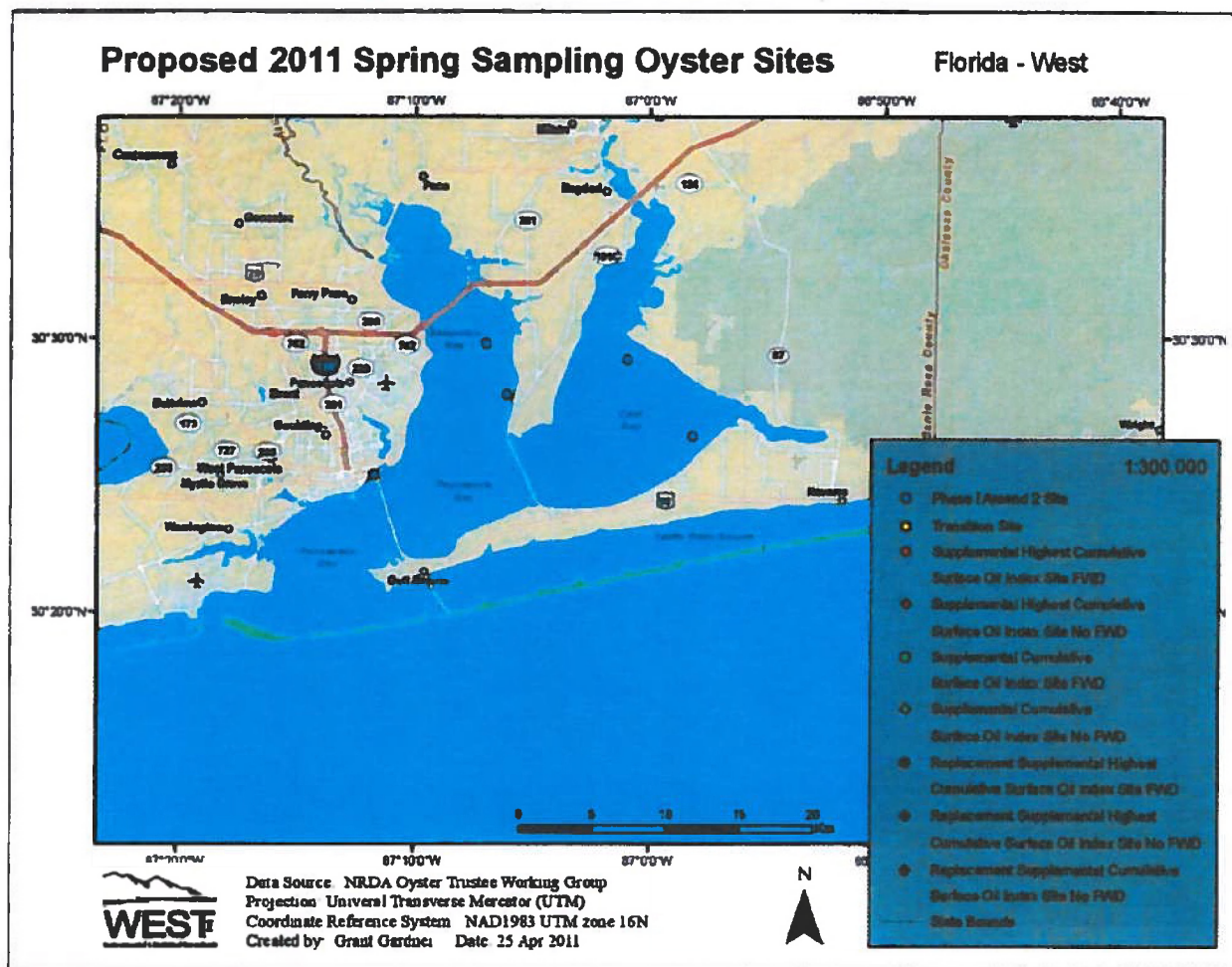


Figure 12. 2011 Spring Sampling Locations in Florida (West)



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